

Parks — a haven for frogs?

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Abstract

A frog survey was undertaken in Churchill National and the adjacent Lysterfield State Park in the 12 months beginning May 2008. Frogs were identified by their advertisement calls. Nine species were identified including the state significant Southern Toadlet *Pseudophryne semimarmorata*. The Parks therefore provide habitat for the majority of frogs with known distributions in the region. The survey was undertaken in a period of below average rainfall and a follow-up visit after a heavy rainfall event demonstrated how rainfall is critical to results, when using this survey technique. The follow-up visit found six species at sites where they had not been previously recorded, including one species heard at five additional sites. The survey provided evidence of the suitability of artificial wetlands for frogs. The results showed the need for a survey relying on advertisement calls to cover an annual cycle given the seasonality of frog mating activity. (*The Victorian Naturalist* 127 (5) 2010, 201-204).

Key words: frogs, parks, rainfall, human-constructed wetlands, seasonality

Introduction

Churchill National Park and Lysterfield State Park make up 1668 ha of contiguous reserve, some 35 km south-east of Melbourne. Churchill National Park was proclaimed as such in 1943 and consists of mainly remnant vegetation (Cook 1994), although some has been modified due to a power easement. Quarrying previously took place within its boundaries. The adjacent Lysterfield State Park, once agricultural land, contains a lake that was constructed in 1929 to provide water for domestic and agricultural use to the south (Coulson 1959). To improve water quality, surrounding agricultural land in the lake's catchment was compulsorily acquired in the early 1940s. In the late 1950s, the State Rivers and Water Supply Commission carried out a re-forestation program in the form of eucalypt plantations (Coulson, 1959). Lysterfield Lake was no longer required as a water supply after 1975 when Cardinia reservoir became operational. In 1997, the two parks were joined by the purchase of an area known as the 'link lands'. These link lands, formerly used for farming, are being revegetated gradually with indigenous species.

This survey was carried out to assess frog species richness in the parks. Fourteen wetland sites were selected, to represent both a geographical spread across the parks, and the diversity of wetland types. Six of the sites were in Churchill National Park, two in the link lands and six in Lysterfield Park. All the sites were either totally

human-constructed (lake, dam or channels) or modified in some way (e.g. a track blocking a creek). Both natural and constructed wetlands have previously been shown to support similar numbers of frog species (Hazell *et al.* 2004). All sites contained vegetation or debris in and around the water column.

The parks were visited 11 times (approximately one month apart) in the 12 months beginning May 2008. At each site, frog calls were recorded for five minutes using a JNC USB350 digital recorder and a Yoga EM-2700 video camera microphone. Nine species of frog were identified in the study (Table 1). Findings were submitted to Melbourne Water for inclusion in their frog census. Melbourne Water assisted with the interpretation of calls.

The maximum site species richness was six (at three sites) and the minimum one (Fig. 1). The



Fig. 1. The frog species richness at the survey sites.

Table 1. The frog species recorded at Churchill National Park and Lysterfield State Park together with the number of sites and nights they were recorded.

Species	Common Name	Number of nights recorded (max 11)	Number of sites recorded (max 14)
<i>Crinia signifera</i>	Eastern Common Froglet	11	12
<i>Geocrinia victoriana</i>	Victorian Smooth Froglet	4	3
<i>Limnodynastes dumerilii</i>	Eastern Pobblebonk	5	7
<i>Limnodynastes peronii</i>	Striped Marsh Frog	2	1
<i>Limnodynastes tasmaniensis</i>	Spotted Marsh Frog	2	5
<i>Litoria ewingii</i>	Southern Brown Tree Frog	9	10
<i>Litoria peronii</i>	Peron's Tree Frog	3	3
<i>Litoria verreauxii verreauxii</i>	Verreaux's Tree Frog	5	4
<i>Pseudophryne semimarmorata</i>	Southern Toadlet	3	2

two sites where only one species was recorded were the boat ramp at Lysterfield Lake and a channel site that rarely contained water.

The species can be divided into generalist callers, autumn/winter callers and spring/summer callers. This spread highlights the importance of surveying all year round when assessing the frog species in an area.

The generalist callers were *Crinia signifera* (12 sites) and *Litoria ewingii* (10 sites). These species were recorded on most nights and in the majority of locations. The sites at which they were not recorded usually lacked any significant water.

The autumn callers were *Geocrinia victoriana* (3 sites) and *Pseudophryne semimarmorata* (2 sites). *Geocrinia victoriana* was recorded at three heavily wooded sites, each on creek lines in remnant vegetation where dams had been constructed. This species also was recorded in a gutter by a track, that was not far from a creek line. *Pseudophryne semimarmorata* was recorded at only two sites, both in the same channel about one km apart. During the survey no other frogs were heard at these sites, which contained little or no water for most of the survey year.



Fig. 2. Eastern Pobblebonk *Limnodynastes dumerilii*. Photo by Robin Drury.



Fig. 3. Striped Marsh Frog *Limnodynastes peronii*. Photo by Robin Drury.

The spring/summer callers were *Limnodynastes dumerilii* (7 sites) (Fig.2), *Limnodynastes peronii* (1 site) (Fig. 3), *Limnodynastes tasmaniensis* (5 sites), *Litoria peronii* (3 sites) (Fig. 4) and *Litoria verreauxii verreauxii* (4 sites). Except for the Lysterfield Lake site, where it was not recorded, *Limnodynastes dumerilii* was recorded at all sites that contained reasonable water levels at some time during the spring/summer period. *Limnodynastes tasmaniensis* showed similar requirements to *Limnodynastes dumerilii*, but was not recorded at as many sites. *Litoria peronii* was recorded at sites where there were reasonable water levels during the survey and adjacent meadow or open canopy. *Litoria verreauxii* recordings showed a similar pattern to *Litoria peronii*, although it was also recorded at one canopied site. *Limnodynastes peronii* was recorded at only one site, a farm dam with adjacent meadow.

Churchill and Lysterfield Parks provide a range of wetland habitats that support nine species of frogs. All species with distributions in the region (Frogs of Australia website) are

represented, except *Litoria raniformis* and possibly *Neobatrachus sudelli*. Two of the species, *G. victoriana* and *P. semimarmorata*, were 'lesser recorded' species in the Melbourne Water frog census 2007-2008 (Ecology Partners 2008). *Pseudophryne semimarmorata*, which has state significance (Ecology Partners 2008), is also listed as vulnerable in the Department of Sustainability and Environment 2007 list (DSE 2007).

The study occurred in an extended drought period in Victoria, with the summer period being particularly dry. Rainfall records from the nearby Horticultural Research Institute in Knoxfield show that the area received only 72% of its long-term average during the study period and only 52% of the summer average. In January and February only 8.5% of their long-term average rainfall was recorded. Water levels were much reduced at most sites after the December 2008 survey and remained so until the end of the study period, in May 2009. The two surveys carried out in late summer/early autumn found call activity at only four and three sites respectively.

Rainfall has been shown to have a primary impact on frog breeding likelihood, irrespective of other seasonal conditions (Littlejohn *et al.* 1993). The availability of water (Ficetola and De Bernardi 2004) and the hydroperiod, or the length of time a wetland retains water, have also been shown to be important determinants of frog activity (Snodgrass *et al.* 2000). Martin (1969) found that soil moisture was also a key determinant in the emergence of burrowing frogs *Limnodynastes dumerilii*.

The lack of rain can lead to an underestimate of the frog species that might use a particular site, especially where one relies only on advertisement calls. This became even more apparent when we carried out a follow-up survey of some of the sites in late November 2009, after 109 mm of rain had fallen in the previous 10 days. All sites had more water than previously seen. On this occasion, six of the species were recorded at sites where previously they had not been heard. *Limnodynastes dumerilii* was recorded at an additional five sites.

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Fig. 4. Peron's Tree Frog *Litoria peronii*. Photo by Robin Drury.